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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/872,892	06/01/2001	Hung-Hsiang Jonathan Chao	Poly-19/APP	3157

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EXAMINER

PHAN, MAN U

ART UNIT	PAPER NUMBER
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2665

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/872,892

Applicant(s)

CHAO ET AL.

Examiner

Man Phan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-16 and 18-37 is/are rejected.
- 7) ☒ Claim(s) 2 and 17 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 June 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 06/25/2001.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

1. This communication is in response to applicant's communications filed 06/01/2001 in the application of Chao et al. for a "Scheduling the dispatch of cells in multistage switches using a hierarchical arbitration scheme for matching non-empty virtual output queues of a module with outgoing links of the module".

Election/Restriction

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-37 drawn to the queues arrangement having queues exclusively on outputs of the network. Subject matter wherein pathfinding through a packet switch involves a particular buffer processing arrangement for control of communication of packets in a packet network, classified in **class 370, subclass 417**.

II. Claim 38 drawn to the Processing of address header for routing, per se. Subject matter having details of techniques or apparatus which process the address information field for switching the packet of information, classified in **class 370, subclass 392**.

3. The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as subcombinations disclosed as usable together in a single

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combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention I has separate utility such as having output queuing only, which does not include the particular listed of the invention II, such as processing of address header for routing utilizing identifiers and pointers. See MPEP ' 806.05(d).

4. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and the search required for Group I is not required for Group II, restriction for examination purposes as indicated is proper.

5. During a telephone conversation with Mr. John Pokotylo (Reg.#36,242) on February 22 2005, affirmation of the election has been made by applicant, and a provisional election was made without traverse to prosecute the invention of group I, claims 1-37. Claim 38 is withdrawn from further consideration by the Examiner, 37 C.F.R. ' 1.142(b), as being drawn to a non-elected invention. Claims 1-37 are pending in the application.

6. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(I).

Claim Rejections - 35 USC ' 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1 recites the limitation "the dispatch of cells" in line 7.

There is insufficient antecedent basis for these limitations in the claim.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1, 3-16, 18-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hughes et al. (US#6,747,971) in view of Angle et al. (US#6,477,169).

With respect to claims 16, 27 and 28, 37, Hughes teaches a combination for use in a multi-stage switch, the combination comprising: a) a plurality of central modules (Fig. 3, modules 309a-309h), each including outgoing links towards output modules (egress ports 306a-306n) including a plurality of output ports (ports 1-14), b) a plurality of input modules (ingress pods 304a-304n), each including individual output queues (312a-312n and 313), and ii) outgoing links coupled with each of the plurality of central modules (shown as lines between ingress ports and 309). Hughes also teaches k input modules (Fig. 3, 304a- 304n), each having n input ports (312a-312n plus 313), $n \times k$ virtual output queues (312a-312n, 313 \times 304a-304n), and m outgoing links (315a-315h); $n \times k$ virtual output queues of each input module are grouped into k groups (304) of n virtual output queues (312 plus 313), and c) means for matching a non-empty virtual output queue of the input module with an outgoing link in the input module (col. 6, lines 64-67 and col. 7, lines 1-4); and d) means for matching the outgoing link of the input module with an outgoing link of one of the central modules (col. 6, lines 10-15).

Hughes does not expressly disclose master arbiters and groups of slave arbiters associated with outgoing links and k group of n virtual output queues respectively. However, Hughes teaches the matching of non-empty virtual output queue includes means for broadcasting (col. 3, lines 66-67 and col. 4, lines 1-2) a request for the non-empty virtual output queue to an arbiter (Fig. 3, request controller 314) for each of the outgoing links of the input module (col. 6, lines 41-44); ii) for each of the outgoing links of the input module, an arbiter for selecting a non-

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empty virtual output queue that broadcast a request (col. 4, lines 24-26 ; iii) means for sending a grant to an arbiter for the selected non-empty virtual output queue (col. 4, lines 26-28)., and iv) for the selected non-empty virtual output queue, an arbiter for selecting an outgoing link from among the one or more outgoing links that sent a grant (col. 4, lines 28-30). In the same field of endeavor, Angle et al. (US#6,477,169) discloses a method and apparatus for scheduling unicast and multicast data in an input-queued network device (Figs. 1, 5 & 8), in which the active request vector registers 540 are coupled to the output grant arbiters 550. Each of the output grant arbiters 550 are presented with priorities and a request vector from the active request vector registers 540. For example, output grant arbiter 0 receives request vector 541 which indicates which of the input ports have a request for output port 0 and identifies the priorities associated with each of the requests. Similarly, output grant arbiters 1 and N receive request vectors 542 and 543, respectively and the associated priorities. Each output grant arbiter 550 looks at the inputs associated with the class of service selected for the current iteration and selects one request on behalf of the corresponding output port. According to one embodiment, the output grant arbiters 550 select the request closest in priority to the GRRC in a circular fashion. A vector identifying the selected and non-selected input ports is then stored in the grant vector registers 570. Once an output grant arbiter 550 has matched an input port to its corresponding output port, it is disabled in all further iterations of the multicast scheduling cycle in order to prevent the output grant arbiter 550 from making additional matches (Col. 10, lines 25 plus).

Regarding claims 18, 25 and 29, 36, Hughes teaches means for matching a non- empty virtual output queue of an input module with an outgoing link in the input module performs the match within one cell time slot (Col. 6, lines 27-33, 54-58 and 63-67).

Regarding claims 19, 21, 23 and 30, 32, 34, Hughes teaches the arbiter of each of the outgoing links operates in accordance with a round robin discipline through each of the virtual output queues of the input module (col. 3, lines 44-47 and Col. 18, lines 3-10).

Regarding claims 20, 22, 24 and 31, 33, 35, Hughes teaches the arbiters operates independent of the others (Col. 3, lines 37-43).

Regarding claim 26, Hughes teaches the means for matching the outgoing link with an outgoing link of one of the central modules include: i) means for sending a request for the outgoing link of the input module to an arbiter for each of the outgoing links of the central modules that lead towards an output port associated with the virtual output queue matched with the outgoing link of the input module (Col. 7, lines 16-24), and ii) for each of the outgoing links of the central module, an arbiter for selecting an outgoing link of the input module that sent a request (Col. 8, lines 10-12).

Regarding claims 1, 3-15, they are method claims corresponding to the apparatus claims 16, 18-37 above. Therefore, claims 1, 3-15 are analyzed and rejected as previously discussed with respect to claims 16, 18-37.

One skilled in the art would have recognized the need for effectively and efficiently scheduling packets buffered at input ports of a multi stage switch in telecommunication network, and would have applied Angle's novel use of the arbiters in scheduling port connection into Hughes's teaching of multi stage switch employs input buffering architectures. Therefore, It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to apply Angle's multicast and unicast scheduling for a

network device into Hughes' crosspoint switch with independent schedulers with the motivation being to provide a method and apparatus for scheduling the service of cells or packet buffered at input ports of a switch.

Allowable Subject Matter

11. Claims 2 and 17 are objected to as being dependent upon the rejected base claims, but would be allowable if rewritten in independent form including all of the limitations of the base claims and any intervening claims.

12. The following is an examiner's statement of reasons for the indication of allowable subject matter: The closest prior art of record fails to disclose or suggest the steps of means for sending on behalf of each non-empty virtual output queue, a request to slave arbiters, each of the slave arbiters being associated with one of the outgoing links of the input module, and each of the slave arbiters being associated with one of the groups of virtual output queues; and means for sending, on behalf of each of the groups of virtual output queues to which a non-empty virtual output queue belongs, a request to master arbiters, each of the master arbiters being associated with one of the outgoing links of the input module, as specifically recited in claims 2 and 17.

13. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The Nichols et al. (US#6,473,428) is cited to show the multi-threaded, multicast switch.

The Chong et al. (US#6,657,959) is cited to show the systems and methods for implementing ABR with guaranteed MCR..

The Angle et al. (US#2003/0007498) is cited to show the multicast and unicast scheduling for a network device.

The Koning et al. (US#6,125,112) is cited to show the non-buffered, non-blocking multistage ATM switch.

The Roberts et al. (US#6,816,487) is cited to show the mapping of high bandwidth connections in a multi stage switch.

The Sawicz et al. (US#6,021,124) is cited to show the multi-stage switch.

The Pelissier et al. (US#6,661,773) is cited to show the method for detection of stale cells following route changes in data communication.

The Olnowich et al. (US#5,495,474) is cited to show the switch-based microchannel planar apparatus.

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15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Phan whose telephone number is (571) 272-3149.

The examiner can normally be reached on Mon - Fri from 6:00 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

16. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

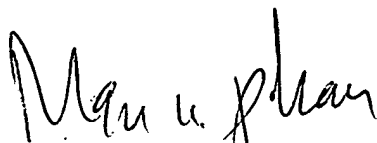
or faxed to: (703) 305-9051, (for formal communications intended for entry)

Or: (703) 305-3988 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive,
Arlington, VA., Sixth Floor (Receptionist).

Mphan

02/23/2005.



MAN U. PHAN
PRIMARY EXAMINER